DRAWER CABINET STORAGE KIT

Field of the Invention

This invention relates generally to a drawer cabinet kit constructed of plastic structural panels. More specifically, the present invention relates to a cabinet constructed of injection molded plastic panels to contain a plurality of drawers with modular snap-in guides and which is capable of being packaged and shipped assembled or in a knocked-down state and constructed into a secure drawer cabinet at a desired site.

Background Information

Throughout the home, a need exists to store a large variety of different items. This is particularly true of garage and utility areas where a vast array of products have been developed to increase the comfort level of living. The accumulation of these various objects and products gives rise to a need for adequate storage of those items when not in use.

Various cabinets for storing household items such as gardening tools, automotive supplies, barbeque accessories and the like are well known. One of the more popular type of cabinets for storing household items is a cabinet with a

plurality of pull-out drawers. Cabinets of this type are generally shipped to a consumer or a supplier fully assembled. Shipping fully assembled cabinetry requires a considerable amount of space available within a shipping medium. Because space is limited, the cost associated with shipping assembled cabinets is comparatively high.

Alternatively, drawer cabinet assemblies are customized for the consumer based on the consumer's needs. With customized cabinets, the consumer selects the cabinet material, the size of the associated drawers and the drawer guides needed to guide the drawers in and out of the cabinet. Numerous devices have been utilized throughout history to guide drawers in and out of drawer cabinets. The simplest mechanism is a box in which the drawer slides. Other methods of control include runners on either side of the drawer or a single runner under the bottom of the drawer with notches to hold the drawer in alignment with the cabinet. All of these basic guide systems have high levels of friction between the drawer and the cabinet and, consequently, rapidly wear out. Numerous low friction devices have been designed to facilitate movement of drawers in and out of cabinets including ball bearings, wheels, and sliders. Most of these low friction devices require unsightly tracks along the side of the drawers and wide spaces between the sides of the

drawers and the drawer face to allow passage of the low friction devices from the inside of the drawer cabinet to the outside when the drawer is extended.

Side play of the drawer when extended is another difficult problem, particularly in the basic forms of drawer guides. Often the drawer must be moved from side to side and up and down in order to get it to return to the drawer cabinet. As the guides become worn, the problem becomes even more severe. Even drawer slides utilizing rollers, ball bearings and sliders have binding problems, especially when the drawers are heavily loaded or the slide parts have become slightly worn.

The ball bearing type of drawer slide creates a different problem. Because there is virtually no side play in a ball bearing slide the drawer cabinet must be perfectly aligned with the drawer slide in order to eliminate binding as the drawer is moved in and out. Skilled labor and time are required to properly position a ball bearing slide.

Fabrication costs of low friction slide arrangements are another problem. The slide arrangements must be specially made for each different length of drawer. A long drawer requires a long slide arrangement and a short drawer requires a short slide arrangement. Manufacturers are required to

maintain supplies of many different lengths of drawer slides or modify slides for each customer.

Full extension drawer slides are a variation of the typical drawer slide and are used to permit full extension of drawers such that the back of the drawer is fully accessible. Such drawer guides usually use three or more rails with one rail (cabinet rail) being attached to the cabinet, one rail (drawer rail) being attached to the drawer and one rail (floating rail) gliding between the drawer and cabinet rails. Examples of such drawer guides are disclosed in United States Pat. Nos. to Card, 1,537,067, Tobey, 2,099,148, Schaffert, 1,129,831, Bullock et al, 3,203,749, Vander Ley, 4,004,841, Lautenschalager 5,733,027, Fleisch, 5,895,102, Fraccaro, 6,390,574. In these systems, rollers or ball bearings are provided on racks between the floating rail and the cabinet and drawer rails to provide free gliding movement between each of the rails.

One of the problems associated with such systems is that they tend to be rather large and bulky which limits their use on smaller drawers. Further, such systems are relatively complicated and difficult to fabricate, resulting in high costs to consumers.

Such prior art systems have not met all of the needs of manufacturers to provide a product that can be easily

manufactured, packaged and shipped, or the needs of consumers requiring economical and versatile do-it-yourself storage kits. Moreover, because the prior art devices do not break down they are difficult and expensive to ship from the manufacturer to the consumer.

Paramount among such needs is an easy to assemble kit which can be easily assembled by an average homeowner. Structure is a further consideration, the cabinet formed by the panels must create cabinet walls which resist panel separation, buckling and racking in such a way as to unify the entire enclosure.

Also, from a versatility standpoint, a cooperating drawer and guide should be present which can be easily assembled or modified after assembly of the side, top, bottom and back panels, and which provides security and dependable access to the contents of the drawers without the complex and difficult to assemble mechanisms associated with the prior art.

There are also commercial considerations that must be satisfied by any viable drawer cabinet system or kit; considerations which are not entirely satisfied by state of the art products. The drawer cabinet must be formed of relatively few component parts that are inexpensive to manufacture by conventional techniques. The drawer cabinet

must also be capable of being packaged and shipped in a knocked-down state.

In addition, there are ergonomic needs that a drawer cabinet system must satisfy in order to achieve acceptance by the end user. The system must be easily and quickly assembled using minimal hardware and requiring a minimal number of tools. Further, the system must not require excessive strength to assemble or include heavy component parts. Moreover, the system must assemble together in such a way so as not to detract from the internal storage volume of the resulting wall cabinet or otherwise negatively affect the utility of the drawer cabinet.

Brief Description of the invention

The present invention provides an assembly, or kit, of injection molded panels having integrated connectors which combine to form a drawer cabinet with a plurality of snap-in drawer guide members and cooperating pull out drawers. The cabinet panels are formed of injection molded plastic and include integrally formed connectors to interlock with one another without the need for separate fasteners. The integrated connection of the side walls and top and bottom panels simplifies the drawer cabinet construction and minimizes the number of components required to assemble the drawer cabinet. Injection molding allows the panels to be formed with integral cross-bracing, ribs and gussets for increased rigidity. When supplied as a kit, assembly of the drawer cabinet requires minimal hardware and a minimum number of hand tools.

The drawer cabinet assembly includes a base panel, a back panel, left and right side panels and a top panel. The base panel is constructed with integrally formed outwardly extending contoured locking posts for interlocking cooperative engagement with sockets formed into the ends of the left, right and back panels. The engagement between the locking posts and the sockets serve to rigidly connect the components together, preventing the panels from bowing

inwardly or outwardly under loads to provide a structurally sound cabinet with a pleasing aesthetic appearance.

The interior portion of the cabinet includes integrally molded vertical rails extending along each side. The rails extend from the base panel to the top panel. Each rail is constructed to accept a plurality of snap-in drawer guide members in a vertically spaced and generally parallel arrangement to cooperate with a combination of drawers to fill the cabinet. This construction allows the consumer to customize the drawer cabinet for a particular storage requirement. Cooperating with the vertical rails are snap-in drawer guide members having a rotatably mounted roller secured within the front portion thereof. The snap in guide members minimize complexity of completing the assembly while increasing versatility by allowing the consumer to customize the assembly for specific needs. The snap-in construction of the drawer guides eliminate the need for skilled tradesmen to line-up and mount complicated hardware within the cabinet. In this manner the consumer can select a plurality of drawers having various heights, snap in the drawer guides, and thereafter slide in the drawers to complete the assembly.

The drawers are pre-constructed of polymeric material including a first roller rotatably mounted on each lower rear corner and a second roller rotatably mounted on each upper

rear corner. The first rollers are adapted to cooperate with an adjacent lower drawer guide to support the rear portion of the drawer and the second rollers are adapted to cooperate with an adjacent upper guide to prevent the drawer from tipping as it is pulled outwardly.

In operation, as a loaded drawer is pulled outward it rolls freely on the fixed position guide roller and the rollers at the bottom rear of the drawer. As the guide roller and the drawer rollers get closer together the weight in the drawer causes a cantilever action across the guide roller and the rollers positioned at the upper rear of the drawer roll along the lower portion of the adjacent guide above. This construction allows the drawers to be easily opened with heavy loads without requiring complex sliding track mechanisms to prevent tipping of the drawer.

Accordingly, it is an objective of the present invention to provide a polymeric drawer cabinet assembly having a plurality of modular cooperating drawer and guide assemblies.

It is a further objective of the present invention to provide a modular snap-in drawer guide device, by which a cooperating drawer can be smoothly guided inwardly and outwardly of a cabinet body without the need for complex metal guiding mechanisms.

Yet a further objective of the present invention is to provide a modular polymeric drawer guide device which allows the drawer to be guided a sufficient distance out of the cabinet body to provide access to the interior of the drawer.

Still yet a further objective of the present invention is to provide a drawer cabinet assembly constructed from panels having integrated connectors which accommodate injection molding plastic formation of the panel components for increased structural integrity.

Another objective of the present invention is to provide a drawer cabinet storage kit in which the side walls, top panel, and bottom panel are interlocked without the need for separate fasteners.

Yet another objective of the present invention is to provide a kit for a drawer cabinet that is capable of being packaged and shipped in a knocked-down state and constructed into a secure drawer cabinet.

Still yet another objective of the present invention is to provide a drawer and guide assembly which allows an end user to customize a drawer cabinet to suit an individual application.

Other objectives and advantages of the present invention will become apparent from the following description taken in conjunction with the accompanying drawings wherein are set

forth, by way of illustration and example, certain embodiments of this invention. The drawings constitute a part of this specification and include exemplary embodiments of the present invention and illustrate various objects and features thereof.

BRIEF DESCRIPTION OF THE FIGURES

FIGURE 1 is a perspective view of the instant invention;

FIGURE 2 is an exploded view of the instant invention, illustrated with the drawers and drawer guides omitted for clarity;

FIGURE 3 is a partial exploded view of the instant invention, illustrating a drawer guide and the inner surface of a side panel;

FIGURE 4 is a perspective view of a drawer utilized in the instant invention;

FIGURE 5 is a section view taken along line 1-1 of FIGURE 1.

Detailed Description of the Preferred Embodiments

While the present invention is susceptible of embodiment in various forms, there is shown in the drawings and will hereinafter be described a presently preferred embodiment with the understanding that the present disclosure is to be considered an exemplification of the invention and is not intended to limit the invention to the specific embodiments illustrated.

FIGS. 1 and 2 which are now referenced illustrate perspective and exploded views of the drawer cabinet assembly, generally referenced as 10, according to a preferred embodiment of the present invention. The drawer cabinet is made up of a base panel 100 and top panel 200, left side panel 300, right side panel 400, rear panel 500 (FIG. 2), drawer guides 600 (FIG. 3) and drawers 700. In the preferred embodiment, the panels comprising the assembly are formed of but not limited to a suitable polymeric material, through the process of injection molding. The result is that the panels comprising the drawer cabinet assembly 10 are formed as unitary panels with integral connectors, and cross bracing. Strengthening ribs 120, 220 (FIG. 5) are integrally formed within the lower surfaces of the top and base panels 100, 200 in order to enhance rigidity of the panels while leaving the external surface in a generally smooth condition

for aesthetic purposes, as shown in FIG. 1. Injection molding offers significant strength and stability advantages over wood or metal construction as utilized in the prior art. In this manner the enclosure of the instant invention is capable of handling a significant amount of weight as compared to wooden or sheet metal cabinets.

The base panel 100 has an upper surface 102, lower surface (not shown), front edge 104, rear edge 106, left edge 108 and right edge 110. Adjacent to each of the rear, left, and right edges 106, 108, 110 is a means of attaching the base panel to the left side panel 300, right side panel 400, and back panel 500 illustrated herein as a plurality of formed locking posts 112 extending outwardly from the upper surface. The integrally formed locking posts 112 are constructed and arranged to cooperate with sockets 310 extending inwardly in a linear fashion along the upper and lower edges of the left 300, right 400, and back 500 panels. The locking posts 112 and sockets 310 are constructed and arranged so that the locking posts 112 enter and mateably engage the sockets 310 securing the panels together in an inter-fitting perpendicular engagement. In a most preferred embodiment, the base panel locking posts 112 each include at least one integrally formed spring-tab 114. The spring-tabs are constructed and arranged to cooperate with apertures 314

provided in the locking sockets 310 for positively maintaining secure coupling engagement between the base panel 100 and the left, right and back panels 300, 400 and 500.

The top panel 200 has an upper surface 202, lower surface 204, front edge 206, rear edge 208, left edge 210 and right edge 212. Adjacent to each of the rear, left and right edges 208, 210, and 212 respectively is a means of attaching the top panel to the left side panel 300, right side panel 400, and back panel 500. The means of attaching the panels is illustrated herein as a plurality of formed locking posts 112 extending outwardly from the lower surface 204. The formed locking posts 112 are constructed and arranged to cooperate with sockets 310 extending inwardly in a linear fashion along the upper and lower edges of the left 300, right 400, and back 500 panels. The locking posts 112 and sockets 310 are constructed and arranged so that the locking posts 112 enter and mateably engage the sockets 310 securing the panels together in an inter-fitting perpendicular engagement. In a most preferred embodiment, the top panel locking posts 112 each include at least one integrally formed spring-tab 114. The spring-tabs are constructed and arranged to cooperate with apertures 314 provided in the locking sockets 310 for positively maintaining secure coupling

engagement between the base panel 100 and the left, right and back panels 300, 400 and 500.

The back panel 500 is constructed and arranged for enclosing the back of the drawer cabinet 10. The back panel 500 includes a top edge 502, a bottom edge 504, a left edge 506, and a right edge 508. The top edge 502 and bottom edge 504 include a means for attaching the back panel to the base panel 100 and the top panel 200 in a perpendicular relationship. The attachment means is illustrated herein as a plurality of locking sockets 310 arranged in a linear fashion extending inwardly along the top and bottom edges. The locking sockets preferably include at least one aperture 314. The apertures 314 are constructed and arranged to cooperate with the locking post spring tabs 114 for positively maintaining secure coupling engagement between the back panel 300 and the base and top panels 100, 200.

The left side panel 300 is constructed and arranged for enclosing the left side of the drawer cabinet. The left side panel 300 includes a top edge 302, a bottom edge 304, a front edge 306, a back edge 308, an inner surface 312 and an outer surface (not shown). The top edge 302 and the bottom edge 304 include a means for attaching the left side panel to the base panel 100 and the top panel 200 in a perpendicular relationship. The attachment means is illustrated herein as

a plurality of locking sockets 310 arranged in a linear fashion extending inwardly along the top and bottom edges 302, 304. The locking sockets 310 preferably include at least one aperture 314. The apertures 314 are constructed and arranged to cooperate with the locking post spring tabs 114 for positively maintaining secure coupling engagement between the left side panel 300 and the base and top panels 100, 200. The inner surface 312 includes an integrally formed means for mounting a plurality of drawer guides in a vertically spaced and generally parallel relationship. The drawer guide mounting means is illustrated herein as a pair of like-constructed vertical rails 316 integrally molded on the inner surface 312 of the left side panel 300. One of the vertical rails 316 is positioned generally adjacent to the front edge 306 and one of the vertical rails 316 is positioned generally adjacent to the rear edge 308 of the left panel 300. The vertical rails 316 extend from about the bottom edge 304 of the panel to about the top edge 302 of the panel. The vertical rails 316 each include a plurality of vertically spaced apertures 318 which are constructed and arranged to cooperate with a plurality of drawer guides 600 for removable attachment thereof.

The right side panel 400 is constructed and arranged for enclosing the right side of the drawer cabinet 10. The

right side panel 400 includes a top edge 402, a bottom edge 404, a front edge 406, a back edge 408, an inner surface (not shown) and an outer surface 414. The top edge 402 and the bottom edge 404 include a means for attaching the right side panel 400 to the base panel 100 and the top panel 200 in a perpendicular relationship. The attachment means is illustrated herein as a plurality of locking sockets 310 arranged in a linear fashion extending inwardly along the top and bottom edges 402, 404. The locking sockets 310 preferably include at least one aperture 314. The apertures 314 are constructed and arranged to cooperate with the locking post spring tabs 114 for positively maintaining secure coupling engagement between the right side panel 400 and the base and top panels 100, 200. The inner surface includes an integrally formed means for mounting a plurality of drawer guides in a vertically spaced and generally parallel relationship. The drawer guide mounting means is illustrated herein as a pair of like-constructed vertical rails 316 integrally molded on the inner surface of the left side panel 400. One of the vertical rails 316 is positioned generally adjacent to the front edge 406 and one of the vertical rails 316 is positioned generally adjacent to the rear edge 408 of the left panel 400. The vertical rails 316 extend from about the bottom edge 404 of the panel to about

the top edge 402 of the panel. The vertical rails 316 each include a plurality of vertically spaced apertures 318 which are constructed and arranged to cooperate with a plurality of drawer guides 600 for removable attachment thereof.

The left, right and back panels 300, 400 and 500 are attached to the top and bottom panels 100 and 200 by inserting the locking posts 112 into locking sockets 310 until the spring tabs 114 integrally formed into the locking posts 112 engage the apertures 314 in the sockets 310 of the left, right and back panels 300, 400 and 500. It will be appreciated that the purpose of the locking posts 112 are to align two panels in a perpendicular relationship and to facilitate their mechanical connection. The perpendicular panels are brought into a coupled relationship wherein the locking posts 112 enter the corresponding sockets 310 in the left, right and back panels 300, 400 and 500. The result is a mechanically secure engagement between the panels. The coupling engagement between the panels as described above provides a secure connection and offers several advantages. First, the design allows the panels to be connected without the need for separate fasteners. Second, the design creates a positive lock that prevents separation of the panels. Third, the design maintains alignment of the panels and prevents bowing or bending of either panel relative to one

another. The resultant drawer cabinet created by the combination of the interlocking panels benefits from high structural integrity and reliable operation.

Referring to Figure 3 and 4, to accommodate a combination of various sized drawers 700 to fill the drawer cabinet, a plurality of drawer guides 600 are provided. The drawer guides 600 are constructed and arranged to cooperate with the mounting means provided on the inner surfaces of the left and right side panels 300, 400 and the drawers 700 to provide support and prevent tipping and canting of the drawers 700, while the drawers are moved inwardly and outwardly of the cabinet assembly.

The drawer guides 600 are constructed and arranged to securely support the drawers while evenly distributing the weight thereof within the cabinet assembly. The drawer guides are generally L-shaped and include a vertical leg 602, a horizontal leg 604, a front portion 606, and a back portion 608, and means for removable securement within the cabinet assembly. In a preferred, albeit non-limiting embodiment, the vertical leg 602 includes a means for removably securing the drawer guides 600 to the inner surfaces of the left and right side panels 300, 400 in a vertically spaced generally parallel relationship, illustrated herein as a pair of outwardly extending locking posts 610. One of the locking

posts 610 is integrally formed into the front portion 606 of the vertical leg 602 and one of the locking posts is integrally formed into the back portion 608 of the vertical leg of the drawer guide 600. The locking posts are preferably constructed and arranged to have a conjugate shape to the apertures 318 provided in the left and right side panel vertical rails 316. In a most preferred embodiment, the drawer guide locking posts 610 each include at least one integrally formed spring-tab 114. The spring-tabs 114 are constructed and arranged to cooperate with apertures 318 provided in the vertical rails 316 for positively maintaining secure coupling engagement between the drawer guides 600 and the left and right side panels 300, 400. For supporting and facilitating easy movement of a loaded drawer 700, the drawer guides 600 include at least one roller 616 rotatably mounted in the front portion 606 of the horizontal leg 604. The roller 616 is sized and positioned between an upper surface 612 and a lower surface 614 of the horizontal leg 604 of the drawer guide 600 so that a portion of the roller protrudes above the top surface. The upper surface of the horizontal leg 604 of the drawer guide 600 also includes an outwardly protruding detent 618. The detent 618 is integrally formed into the rear portion 608 of the drawer guide and is constructed and arranged to cooperate with rollers 720 (FIG.

4) rotatably mounted on the lower rear portion of the drawers for releasably securing a drawer 700 within the drawer cabinet 10. Pulling outward on the drawer 700 allows the rollers to release from the guide detents 618. The lower surface 614 of the horizontal leg 604 of each drawer guide also includes an integrally formed and outwardly protruding stop tab 620 (FIG. 5). The stop tab 620 is constructed and arranged to cooperate with a stop 722 (FIG. 4) formed into the upper rear portion of the drawers 700 to prevent the drawers from being extended completely out of the drawer cabinet.

In operation, the drawer guides 600 may be positioned on the inner surface of the left and right side panels to accommodate a combination of various sized drawers to fill the drawer cabinet by sliding the locking posts 600 into the apertures 318 until the spring-tab 114 engages the left or right side panel. The result is a mechanically secure inter-fitting engagement between the guides and the panels. The design allows the drawer guides to be connected to the panels without the need for separate fasteners.

Referring to FIGS 4 and 5, a plurality of drawers 700 are provided for enclosing the front of the wall cabinet 10 and providing storage within the cabinet. The drawers 700 include a front portion 702, a rear portion 704, a left side

706, a right side 708 and a bottom surface 714. The left side 706 and the right side 708 each include at least one upper roller 710 and at least one lower roller 720 rotatably mounted thereto. In the preferred embodiment the rollers 710 and 720 are mounted within integrally formed roller pockets 712. The upper rollers 710 are rotatably mounted within the upper roller pockets to extend partially outward therefrom to cooperate with the lower surface 614 of an adjacent drawer guide, and wherein the lower rollers 720 are rotatably mounted within the lower roller pockets to extend partially outward therefrom to cooperate with the upper surface 612 of an adjacent drawer guide 600. In this manner, the cooperating rollers and said drawer guides prevent the drawer from tipping as the drawer is extended outwardly from the drawer cabinet. The lower surface 714 of the drawers 700 include a pair of integrally formed detents 716. The pair of detents 716 are constructed and arranged to cooperate with the rollers 616 rotatably mounted in the front portion 606 of the drawer guides 600 for releasably securing a drawer 700 within the drawer cabinet.

Thus, a drawer cabinet kit with a plurality of drawer guides and cooperating drawers has been shown and described. The kit is comprised of injection molded components having

integrated connectors which may be assembled on a desired site without requiring separate fasteners or tools.

All patents and publications mentioned in this specification are indicative of the levels of those skilled in the art to which the invention pertains. All patents and publications are herein incorporated by reference to the same extent as if each individual publication was specifically and individually indicated to be incorporated by reference.

It is to be understood that while a certain form of the invention is illustrated, it is not to be limited to the specific form or arrangement herein described and shown. It will be apparent to those skilled in the art that various changes may be made without departing from the scope of the invention and the invention is not to be considered limited to what is shown and described in the specification.

One skilled in the art will readily appreciate that the present invention is well adapted to carry out the objectives and obtain the ends and advantages mentioned, as well as those inherent therein. The embodiments, methods, procedures and techniques described herein are presently representative of the preferred embodiments, are intended to be exemplary and are not intended as limitations on the scope. Changes therein and other uses will occur to those skilled in the art which are encompassed within the spirit of the invention and

are defined by the scope of the appended claims. Although the invention has been described in connection with specific preferred embodiments, it should be understood that the invention as claimed should not be unduly limited to such specific embodiments. Indeed, various modifications of the described modes for carrying out the invention which are obvious to those skilled in the art are intended to be within the scope of the following claims.